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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/866,587	05/30/2001	Takehiko Nakai	35.C15390	4941
5514	7590	12/27/2005	EXAMINER	
FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112			AMARI, ALESSANDRO V	
			ART UNIT	PAPER NUMBER
			2872	

DATE MAILED: 12/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/866,587

Applicant(s)

NAKAI, TAKEHIKO

Examiner

Alessandro V. Amari

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on RCE on 10/20/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-16 and 18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 16 and 18 is/are rejected.
- 7) ☒ Claim(s) 10-15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 20 October 2005 has been entered.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 9 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Admitted Prior Art (see US 2002/0003661).

In regard to claim 1, the Admitted Prior Art (see Figure 8) discloses a diffractive optical element comprising a periodic first blazed type grating portion (see area corresponding to n1) and a periodic second blazed type grating portion which is arranged on a light exit side of the first blazed type grating portion (see area corresponding to n2), wherein the first blazed type grating portion and the second blazed type grating portion are each formed by a plurality of grating sections as shown in Figure 8 and a pair of grating sections corresponding to each other in each periodic

first and second blazed type grating portions has the same period  $P_t$  (see  $P_t$  at bottom of Figure 8) and each of the grating sections forming at least one of the first blazed type grating portion and the second blazed type grating portion is formed by a sub-wavelength structured grating (5) having a period  $p_1$  smaller than the period  $P_t$ , with the period  $p_1$  being smaller than a wavelength of a light beam used wherein light beams are diffracted by the first blazed type grating portion and the second blazed type grating portion at a specific diffraction order as described in page 1, paragraphs 0008 and 0009 and in the specification, page 2, lines 20-26 and page 3, lines 1-11. Although the prior art does not specifically disclose that the light beams are diffracted by the blazed portions at a specific diffraction order, this is seen to be an inherent teaching of the device since it is a blazed grating and thus will diffract light at optimum efficiency into a specific diffraction order.

Regarding claim 2, the Admitted Prior Art discloses that wherein said diffractive optical element is structured such that within an entire region of used wavelengths, diffraction directions are made different from each other, depending upon a polarization direction of a light beam incident on said diffractive optical element, and a diffracted light is concentrated only to one predetermined diffraction order as described in page 1, paragraphs 0008, 0009 and 0011 and in the specification, page 2, lines 20-26 and page 3, lines 1-11.

Regarding claim 9, the Admitted Prior Art discloses that said used wavelength range corresponds to a light range as described in page 1, paragraphs 0008, 0009 and 0011 and in the specification, page 2, lines 20-26 and page 3, lines 1-11. While the

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Admitted Prior art does not specifically teach that the used wavelength range corresponds to a visible light range this is seen as an inherent teaching of the device since the optical element operates in the visible wavelength range in order to function as intended.

Regarding claim 16, the Admitted Prior Art discloses that the corresponding grating sections of the first and second blazed type grating portions have the same period as shown in Figure 8.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3-8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art in view of Shiono et al US 5,742,433.

Regarding claims 3-8 and 18, the Admitted Prior Art teaches the invention as set forth above but does not teach that in regard to claim 3 that said sub-wavelength structured grating is constituted by one kind of material, or two kinds of materials, and occupation ratios of the respective materials within one period of said periodic structure are made different from each other along a periodic direction of said grating portion or in regard to claim 4, that said diffractive optical element has a step-shaped grating portion or in regard to claim 5, that the sub-wavelength structured grating of the grating portion is varied along the periodic direction of the grating portion or in regard to

claim 6 that said sub-wavelength structured grating is varied along the periodic direction of said grating portion is varied every step of the grating stepped portions or in regard to claim 7, that the sub-wavelength structured grating of the grating portion is varied in a grating thickness direction or in regard to claim 8, that the sub-wavelength structured grating varied in the grating thickness direction is varied every step of the grating stepped portion or in regard to claim 18, that the sub-wavelength structured grating is a rib like sub-wavelength structure of various depth.

Regarding claims 3-8 and 18, Shiono et al teaches (see Figure 4) a step-shaped grating wherein the grating period, depth or thickness can be varied along a periodic direction of the grating portion as shown in Figure 4 and as described in column 6, lines 13-35.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a step shaped grating and to vary the grating period, depth or thickness as taught by Shiono et al for the grating of the Admitted Prior Art in order to improve the diffractive efficiency of the grating.

***Allowable Subject Matter***

6. Claims 10-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
7. Claims 10-15 are allowable for the reasons provided in the previous office action.

***Response to Arguments***

8. Applicant's arguments filed 20 October 2005 have been fully considered but they are not persuasive.

The Applicant argues that the Admitted Prior art, Figure 8 does not teach or suggest, among other features, first and second blazed type grating portions as set forth in Applicant's independent claim 1.

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections. The Applicant simply asserts that Figure 8 of the Admitted Prior Art does not teach the first and second blazed type grating portions (these were identified as the area corresponding to n1 and the areas corresponding to n2) but provides no rationale or other evidence why the elements shown in Figure 8 cannot be interpreted as reading on this limitation. Examiner would like to direct the Applicant's attention to their own Figure 2, which shows elements **4, 5** as being the blazed first and second grating portions which are similar in structure to the corresponding portions identified in Figure 8.

Furthermore, the Applicant argues that the diffraction element in Figure 8 is not arranged to focus diffracted light beams at a specific diffraction order.

In response to this argument, the Examiner would like to point out that claim 1 does not recite that the light beams are "focused". Claim 1 only recites that the light

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beams are diffracted at a specific diffraction order which is inherently taught by the Admitted Prior Art.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (571) 272-2306. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ava/va  
22 December 2005

Alessandro Amari  
Alessandro Amari  
Examiner AU2872